REMARKS

Claims 28-34, 36-48, 50-52 and 54-57 were pending and examined. By virtue of the instant Amendment and Response, claims 28 and 57 are amended, claim 29 is canceled and no claims are added. Claims 1-27, 35, 49, and 53 were previously canceled. Accordingly, claims 28, 30-34, 36-48, 50-52 and 54-57 are currently pending. Applicants submit no new matter is added herein.

Claim Amendments

Without addressing the patentability of claims 28 and 57 as previously presented in view of the cited documents, and without addressing the relevancy (if any) of the documents, and merely to streamline prosecution of the present application, clarifying amendments have been made to claim 28 and 57. Support for the amendments can be found throughout the instant application and at least at claim 29, as well as FIGS. 6 and 7.

Rejections Under 35 USC §103

Claims 28-34, 36, 40-43, 47, 54 and 57 were rejected under 35 USC §103(a) as allegedly being unpatentable over U.S. Patent No. 5,875,223 to Nylund in view of U.S. Patent No. 5,331,679 to Hirukawa. Applicants respectfully disagree with the Examiner and traverse this rejection.

Specifically, on pg. 3 of the Office Action, the Examiner states that Nylund "fails to teach that the upper edge, seen transversely to the longitudinal axis, has a wave-like shape with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces." However, the Examiner states that the lack of disclosure in Nylund is remedied by Hirukawa since, according to the Examiner, "Hirukawa teaches a sleeve-like member 12d wherein the upper edge, seen transversely to the longitudinal axis, has a wave-like shape with wave peaks 21b, which are aligned with a respective one of said abutment surfaces 13a, and with wave valleys 22 located between two adjacent ones of said abutment surfaces 13a (figure 13)." *See* Office Action, pg. 3. The Examiner appears to conclude that Hirukawa at col. 9, lines 46-51 provides motivation to

combine the two cited references and therefore, it would have been obvious to one of ordinary skill in the art to construct the sleeve-like member to have a wave-like shape with wave peaks, which are aligned with a respective one of said abutment surfaces, and with wave valleys located between two adjacent ones of said abutment surfaces at the upper edge of said sleeve-like member. Applicants respectfully disagree.

The disclosures of Nylund and Hirukawa were summarized in Applicants' response dated November 12, 2008, which is incorporated herein in its entirety, and therefore not reiterated herein.

The spacer, as recited in claims 28 and 57, and the claims dependent therefrom, includes, *inter alia*, a spacer enclosing a number of cells, each cell being formed by a sleeve-like member having a lower edge and an upper edge; the sleeve-like member including a number of elongated abutment surfaces that project inwardly towards the longitudinal axis and extend substantially in parallel with the longitudinal axis for abutment to the fuel rod to be received by the cell; the lower edge seen transversely to the longitudinal axis, having a wave-like shape with wave peaks, which are aligned with a respective one of the abutment surfaces, and wave valleys located between two adjacent ones of the abutment surfaces and an upper edge, seen transversely to the longitudinal axis, has a wave-like shape with wave peaks, which are aligned with a respective one of the abutment surfaces, and with wave valleys located between two adjacent ones of the abutment surfaces, each of the elongated abutment surfaces extending from a respective one of the wave peaks of the upper edge to a respective one of the wave peaks of the lower edge.

The instantly claimed invention is entirely contrary to Nylund. As acknowledged by the Examiner, Nylund does not disclose an upper edge having a wave-like shape. *See*, Office Action at p. 3, and Nylund at FIG. 5 and col. 3, lines 29-32. Moreover, the lack of disclosure in Nylund is not remedied by the disclosure of Hirukawa.

Hirukawa discloses a sleeve for a spacer for a nuclear fuel unit. *See* Hirukawa at col. 1, lines 5-7. FIG. 13 of Hirukawa appears to illustrate a sleeve with a lower edge having an irregular wave shape. It appears wave peaks and wave valleys are provided whereby the distance between the wave peaks varies along the periphery of the sleeve as well as the shape and the distances between the wave valleys. The upper edge of the sleeve in FIG. 13 of Hirukawa also has a wave shape. However, Applicants submit it is not possible to conclude how the wave

shape is configured since only two wave peaks are shown; however, it appears that the two wave peaks seem to be aligned with a respective wave valley of the lower edge. This is in contrast with the instant invention, which has wave valleys of the lower edge aligned with wave valleys of the upper edge. This is indicated in the instant claims as: the *lower edge* seen having a wave-like shape with wave peaks, which are aligned with a respective one of the abutment surfaces, and *wave valleys located between two adjacent ones of the abutment surfaces* and an *upper edge* has a wave-like shape with wave peaks, which are aligned with a respective one of the abutment surfaces, and *with wave valleys located between two adjacent ones of the abutment surfaces*.

Furthermore, both Nylund and Hirukawa fail to disclose elongated abutment surfaces extending from a respective one of said wave peaks of the upper edge to a respective one of said wave peaks of the upper edge as recited in the instant claims.

Nylund discloses four supports that include elongated embossments facing the center of the sleeve, the supports extending along the whole length of the sleeve. *See* Nylund, col. 3, lines 17-25. Hirukawa discloses projections (abutments) 13a, which project inward from the ferrule, are formed thereto at portions below the trapezoidal petal portions and other projections 13b are also formed to the ferrule at portions near the other end portion to which any cutout portion is not formed. These projections 13a and 13b are formed by inwardly projecting portions of the tubular wall of the ferrule itself. *See* Hirukawa at col. 4, lines 19-26.

The projections and supports (abutments) described and illustrated in both Nylund and Hirukawa are in complete contrast to the abutment surfaces of the instant claims, since neither the supports of Nylund or the projections of Hirukawa extend from a respective one of the wave peaks of the upper edge of the sleeve to a respective one of the wave peaks of the lower edge of the sleeve as recited in the instant claims. While the supports of Nylund do extend the length of the sleeve, the supports do not extend from a wave peak on the upper edge of the sleeve to a wave peak on the lower edge of the sleeve because Nyland does not disclose or suggest having wave peaks on both edges of the sleeve. The projections of Hirukawa simply do not extend from a lower edge to an upper edge, let alone extend from a respective one of the wave peaks of the upper edge to a respective one of the wave peaks of the lower edge as recited in the instant claims.

One of ordinary skill in the art would not combine the two references to obtain the instantly claimed invention since Nylund seeks to solve the problem of wear on fuel rods caused by foreign matter adhering to the upstream edge of the spacer while Hirukawa seeks to provide a fuel spacer capable of achieving a reduced pressure loss of the fuel spacer and improving the limit power output of the fuel assembly. *See* Nyland at col. 1, lines 56-58 and Hirukawa at col. 1 line 65 to col. 2, line 2.

Nevertheless, even if one were to combine the two references, one of ordinary skill in the art would not be motivated to make the sleeve-like member recited in the instant claims since the combination of the references does not disclose or suggest a spacer that includes all of the recited elements. Applicants submit the Examiner is employing an impermissible hindsight analysis in the instant rejection since the only motivation to combine the two references is the instant application.

Accordingly, Applicants submit the instant rejection as applied to independent claims 28 and 57, and the claims dependent therefrom, is overcome and respectfully request the Examiner reconsider and withdraw the instant rejection.

Claims 37-39 were rejected under 35 USC §103(a) as allegedly being unpatentable over Nylund and Hirukawa as applied to claim 1, and further in view of U.S. Patent No. 6,901,128 to Mori et al. Applicants respectfully disagree and traverse this rejection.

Nylund and Hirukawa are discussed above. Mori et al. relates to a fuel assembly in a pressurized water reactor, and in particular, to a foreign matter filter serving as a protection means against foreign matter for preventing intrusion of foreign matter into a fuel effective portion in a coolant. *See* col. 1, lines 9-13.

Applicants respectfully disagree with this rejection, but do not believe it is necessary to address this rejection in detail since claims 37-39 indirectly depend from claim 28 and, as explained in detail above, neither Nylund nor Hirukawa, taken separately or in any combination, teach or suggest the spacer recited in claim 28. Mori et al. does not change the analysis with respect to claim 28 or any of the claims dependent therefrom. Accordingly, Applicants submit this rejection is overcome and respectfully request the Examiner withdraw the rejection.

Claims 48 and 51 were rejected under 35 USC §103(a) as allegedly being unpatentable over Nylund, Hirukawa and Mori as applied to claim 37, and further in view of U.S. Patent No. 5,272,741 to Masuhara et al. Applicants respectfully disagree and traverse the instant rejection.

Nylund, Hirukawa and Mori et al. are discussed in detail above. Masuhara et al. relates to a nuclear fuel assembly and more particularly to a nuclear fuel assembly for a boiling water reactor having space structure improved on heat transfer from fuel rods to the coolant. *See* col. 1, lines 6-9.

Applicants respectfully disagree with this rejection, but do not believe it is necessary to address this rejection in detail since claims 48 and 51 indirectly depend from claim 28 and, as explained in detail above, neither Nylund nor Hirukawa, taken separately or in any combination, teach or suggest the spacer recited in claim 28. Neither Mori et al. nor Masuhara et al., change the analysis with respect to claim 28 or any of the claims dependent therefrom. Accordingly, Applicants submit this rejection is overcome and respectfully request the Examiner withdraw the rejection.

Claims 44 -46 are rejected under 35 USC §103(a) as allegedly being unpatentable over Nylund and Hirukawa and further in view of U.S. Patent No. 4,800,061 to Shallenberger et al. Applicants respectfully disagree and traverse the instant rejection. Applicants respectfully disagree and traverse this rejection.

Nylund and Hirukawa are discussed in detail above. Shallenberger et al. discloses an apparatus and method for facilitating a scratchless insertion of a fuel rod into cellular grids of a nuclear fuel assembly. *See* Abstract.

Applicants respectfully disagree with this rejection, but do not believe it is necessary to address this rejection in detail since claims 44 -46 depend directly from claim 28 and, as explained in detail above, neither Nylund nor Hirukawa, taken separately or in any combination, teach or suggest the spacer recited in claim 28. Shallenberger et al. does not change the analysis with respect to claim 28 or any of the claims dependent therefrom. Accordingly, Applicants submit this rejection is overcome and respectfully request the Examiner withdraw the rejection.

Claims 50 and 52 were rejected under 35 USC §103(a) as allegedly being unpatentable over Nylund and Hirukawa and further in view of Masuhara et al. Applicants respectfully disagree and traverse this rejection.

Nylund, Hirukawa and Masuhara et al. are discussed above.

Applicants respectfully disagree with this rejection, but do not believe it is necessary to address this rejection in detail since claims 50 and 52 indirectly depend from claim 28 and, as explained in detail above, neither Nylund nor Hirukawa, taken separately or in any combination, teach or suggest the spacer recited in claim 28. Masuhara et al. does not change the analysis with respect to claim 28 or any of the claims dependent therefrom. Accordingly, Applicants submit this rejection is overcome and respectfully request the Examiner withdraw the rejection.

Claims 55 and 56 were rejected under 35 USC §103(a) as allegedly being unpatentable over Nylund and Hirukawa and further in view of U.S. Patent No. 5,778,035 to Nylund (referred to hereinafter as "Nylund 2").

Nylund and Hirukawa are discussed above. Nylund 2 relates to a method for equalizing the cooling between less loaded and more loaded sub-regions of a fuel assembly or between fuel assemblies in a light-water nuclear reactor. The equalization of the cooling is achieved by mixing a coolant flow within a mixing cross section comprising four orthogonally arranged sub-regions which may have considerably different power levels because of different degrees of burnup or the effect from the surroundings. *See* col. 1, lines 5-13.

Applicants respectfully disagree with this rejection, but do not believe it is necessary to address this rejection in detail since claims 55 and 56 indirectly depend from claim 28 and, as explained in detail above, neither Nylund nor Hirukawa, taken separately or in any combination, teach or suggest the spacer recited in claim 28. Nylund 2 does not change the analysis with respect to claim 28 or any of the claims dependent therefrom. Accordingly, Applicants submit this rejection is overcome and respectfully request the Examiner withdraw the rejection.

Applicants believe the foregoing amendments and remarks are fully responsive to the Office Action and that the claims as now presented herein are allowable. An early action to that effect is earnestly solicited. If the Examiner believes that a telephone conference with Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is invited to telephone the undersigned.

Applicants believe that no fees are due with the submission of this Amendment and Response. However, if any charges are incurred with respect to this Amendment, they may be charged to Deposit Account No. 503342 maintained by Applicants' attorneys.

Respectfully submitted,

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